

### REMARKS

Reconsideration of this application is respectfully requested. Claims 1, 2, 4, 5, 16 and 17 are pending and at issue.

Claims 1, 2, 4, 5, 16 and 17 have been rejected under 35 U.S.C. §103(a) as obvious over (1) Musser et al., "Effects of L-Carnitine on Performance of Gestating and Lactating Sows", *Swine Day* (1997), (2) Trottier et al., "Effect of Supplemental Chromium Tripicolinate on Sow Productivity and Blood Metabolites" (1998), (3) J. Arthington, Millennium Technologies, "The Original L-Carnitine/Chromium Picolinate Supplement. How and Why it Works?", (April 27, 2000), and (4) Samland et al. ("Samland III"), "Effect of L-Carnitine and Chromium Nicotinate on the Ovulation and Fertilization Rate of Gilts", *Proceedings of American Association of Swine Practitioners* (March 1999).

The Examiner contends that:

- (a) farrowing rate is defined as the number of sows farrowed divided by the number of sows bred in the same batch expressed in percent;
- (b) Musser teaches that L-carnitine increases the total number of pigs born and the number of pigs born alive;
- (c) Trottier teaches that adding trivalent chromium salts to sow diets increases litter size;
- (d) Samland III teaches that L-carnitine and chromium nicotinate influence insulin signaling;
- (e) increased insulin secretion has been shown to increase maturation of ovarian follicles and ovulation rate; and
- (f) increased ovulation rate would increase farrowing rate.

See pages 5 and 6 of the November 30, 2005 Office Action. The Examiner concludes that it would have been obvious to one of ordinary skill in the art to combine the teachings of Musser, Trottier, Arthington and Samland III and add L-carnitine and chromium tripicolinate to sow diets to increase the sows' farrowing rate.

Applicants respectfully traverse this rejection and request reconsideration.

As discussed below, the Examiner's contentions (b) and (c) have no relationship to farrowing rate, contention (d) is wrong, and contention (f) is completely unfounded and unsupported.

The term "farrowing rate" is defined as the number of females farrowed divided by the number of females bred excluding the number of sows removed for nonproductive reasons after mating. *See Koketsu et al., J. Anim. Sci. 75:2580-2587 (1997)* (a copy of which was submitted with the February 24, 2005 Preliminary Amendment). Farrowing rate thus defines the number of sows which after mating in fact farrowed (i.e., gave birth to a litter of pigs). A sow may be bred, but not farrow due to poor conception, i.e., even though the sow was bred, the sperm do not fertilize the eggs and thus conception does not occur. Farrowing rate bears no relationship to litter size, i.e., the number of pigs born.

As discussed below, none of the cited references disclose or suggest that the combination of L-carnitine (or a salt thereof) and chromium tripicolinate can enhance the farrowing rate of a sow, and, in fact, at least two of the references (Musser and Samland III) suggest otherwise.

The Examiner contends that Musser teaches that L-carnitine increases the total number of pigs born and the number of pigs born alive (page 3 of the November 30, 2005 Office Action). Musser, however, does not teach this. Rather, Musser found "no differences ... in total numbers of pigs born, born alive or mummies" (page 33, left column). Furthermore, as discussed above, litter size bears no relation to farrowing rate. The Examiner completely ignores Musser's conclusion, which is based on the empirical data, that "**no differences were observed in subsequent days to estrus or farrowing rate**" (emphasis added) (page 33, left column, last paragraph, to right column, first paragraph). Contrary to the Examiner's arguments, Musser clearly teaches that L-carnitine does not effect the farrowing rate of sows.

The Examiner contends that Trottier teaches that adding trivalent chromium salts to sow diets increases litter size and reduces wean to estrus interval. As already mentioned, litter size bears

no relationship to farrowing rate. Accordingly, any change in litter size has no implications to farrowing rate. Nor does a change in wean to estrus interval relate to a change in farrowing rate. Furthermore, Trottier did not study or discuss farrowing rates. *See* page 5 of the November 19, 2004 Amendment. One of ordinary skill in the art would, therefore, not have any motivation or a reasonable expectation of success based on Trottier to enhance farrowing rate by administering trivalent chromium salts.

Incredibly, the Examiner maintains her contention that Samland III suggests that the combination of L-carnitine and chromium nicotinate would be expected to increase farrowing rate since both nutrients are known to influence insulin signaling, increased insulin secretion has been shown to increase maturation of ovarian follicles and ovulation rate, and increased ovulation rate would increase the farrowing rate. Again the Examiner completely ignores the empirical data. Samland III found "**no effect** of L-carnitine or chromium treatments on insulin, glucose or IGF-1" (emphasis added) (page 33, right column). Thus, on the basis of their own results, the authors conclude that both nutrients have no effect on insulin. Because no increase in insulin secretion was observed, an increase in farrowing rate would not be expected according to the Examiner's "hypothesis."

The empirical data in Samland III also shows that no statistically significant improvement in ovulation rates was observed for the combination of L-carnitine and chromium nicotinate (*see* page 35, Table 1). Only the L-carnitine alone treatment resulted in a statistically significant improvement in ovulation rates. *See* Samland III at page 33 ("An increase ( $P=0.6$ ; Table 1) in ovulation rate was observed for gilts on ... added L-carnitine treatments"). In any event, as noted above, farrowing rate bears no relationship to ovulation rate.

The Examiner points to statements in the Introduction section of Samland III to support that L-carnitine and chromium nicotinate influence insulin signaling. However, this hypothesis was merely the basis for initiating the study: "based on these considerations we evaluated the effects of L-carnitine and chromium nicotinate (CrNic) on ovulation and fertilization rates in gilts". Samland III at page 33, left column, first paragraph. The results, however, do not support the hypothesis.

Accordingly, when taken as a whole, Samland III does not teach or suggest that L-carnitine and chromium nicotinate increase insulin signaling.

The Examiner's statement that an "increase [in] the ovulation rate would increase the farrowing rate" is also erroneous. The ovulation rate is the number of eggs that the sow ovulates. In pigs, the sow normally ovulates from 10 to 25 eggs. When a sow farrows, she may, for example, have 1 piglet or 20 piglets. Farrowing rate is not dependent on the ovulation rate. The metabolic and physiologic factors that control farrowing rate and ovulation rate are different.

Applicants respectfully request the Examiner to provide her basis for believing that an increase in ovulation rate results in increased farrowing rate. If the Examiner is relying on personal knowledge, applicants respectfully request that the Examiner support this personal knowledge with an affidavit containing data as specific as possible pursuant to 37 C.F.R. §1.104(d)(2).

Finally, the results in Samland III show no beneficial reproductive effect with the combination of L-carnitine and chromium nicotinate. *See* Samland III at the paragraph spanning pages 33 and 34, 35 (Table 1).

The Examiner relies on Arthington for its teaching that L-carnitine and chromium picolinate synergistically reduce the amount of fat deposition during the protein phase of growth, and that chromium is necessary for optimal insulin function and glucose uptake in cells. Arthington does not provide any empirical data pertinent to insulin secretion or farrowing rate. The only empirical data in the cited references pertinent to insulin secretion is that provided in Samland III, which shows that the combination of L-carnitine and the chromium salt, chromium nicotinate, does not increase insulin levels. The Examiner has not provided any evidence to show that this finding is erroneous.


Furthermore, the fact that L-carnitine and chromium picolinate may work synergistically to reduce the amount of fat deposition during the protein phase of growth has no implications on the effect of the combination on the farrowing rate of sows. There is no known relationship between the farrowing rate and the amount of fat deposition during the protein phase of growth.

None of the cited prior art references disclose or suggest that the combination of L-carnitine and chromium tripicolinate would enhance the farrowing rate of a sow, as called for by the claims. Accordingly, since the combination of Musser, Trottier, Arthington and Samland III does not disclose or suggest all the limitations recited in the pending claims, a *prima facie* case of obviousness has not been established. Accordingly, applicants respectfully request withdrawal of this rejection.

In view of the above remarks, applicants believe that each of the pending claims in this application is in condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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